

## SCANNER

### BACKGROUND OF THE INVENTION

The present invention relates to scanners and, more particularly, to a dual fulcrum scanner, which is easy to install and, produces less friction force during installation.

The scanner is a standard attachment to a computer system for scanning text data as well as graphic data into the computer. A scanner uses a light source to project light onto document, and sensor means to pick up the image from reflected light. Scanned image data can be modified by an image processing program. If scanned data is a printed matter, it can be converted into a file and stored in the computer by means of the application of "character recognition software".

FIG. 1 shows a scanner according to the prior art. This structure of scanner comprises a sensor rack **11a** holding a sensor **10a**, which can be a CCD (charge-coupled device) or CIS (contact image sensor). The sensor rack **11a** has an axle sleeve **12a** and a belt clamp **13a** at the bottom side. The axle sleeve **12a** is sleeved onto a guide rod **14a**. The belt clamp **13a** is fastened to a belt **15a** for enabling the sensor rack **11a** to be moved back and forth along the guide rod **14a**. Further, spring means **16a** is provided between the sensor rack **11a** and the sensor **10a**. The spring means **16a** imparts an upward pressure to the sensor **10a**, causing the top slide

17a of the sensor 10a to be stopped at the glass 18a for focusing control. This structure of scanner is functional, however it has drawbacks. Because the guide rod 14a must be inserted through the axle sleeve 12a, the installation of the scanner is complicated.

- 5 Further, the surface contact between the axle sleeve 12a and the guide rod 14a produces a great friction force upon movement of the axle sleeve 12a on the guide rod 14a, and the friction force results in unstable movement of the sensor rack 11a and the sensor 10a.

### **SUMMARY OF THE INVENTION**

- 10 The present invention has been accomplished to provide a scanner, which eliminates the aforesaid drawbacks. It is one object of the present invention to provide a scanner, which enables the bottom guide frame of the sensor rack to be directly put on the guide rod during installation, so that the installation
- 15 procedure is simplified, and the installation cost is greatly reduced. It is another object of the present invention to provide a scanner, which guides the guide frame of the sensor rack in contact with the guide rod at two points of contact, so that the friction resistance between the guide frame and the guide rod is minimized. It is still
- 20 another object of the present invention to provide a scanner, which has the guide injection-molded on the bottom frame to minimize the manufacturing cost. To achieve these and other objects of the present invention, the scanner comprises a sensor rack, a sensor

mounted on the sensor rack, and a guide rod adapted to guide reciprocating movement of the sensor rack. The sensor rack has a guide frame disposed at the bottom side in contact with the guide rod. The guide frame has a double-bevel bottom sidewall formed of

5 two bevel surfaces, which are respectively disposed in contact with the guide rod.

### **BRIEF DESCRIPTION OF THE DRAWINGS**

FIG. 1 is a plain view of a scanner according to the prior art.

10 FIG. 2 is a plain view of a scanner according to a first embodiment of the present invention.

FIG. 3 is a plain view of a scanner according to a second embodiment of the present invention.

FIG. 4 is a plain view of a scanner according to a third

15 embodiment of the present invention.

### **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

Referring to FIG. 2, a scanner in accordance with a first embodiment of the present invention is shown comprising a sensor rack 10 movably mounted in the housing (not shown) thereof. The

20 sensor rack 10 carries a sensor 11, which can be a CCD (charge-coupled device) or CIS (contact image sensor). The sensor rack 10 comprises a guide frame 12 and a belt clamp 13 provided at the bottom side thereof. The guide frame 12 has a double-beveled

bottom sidewall formed of two bevel contact surfaces **121;122**. A guide rod **14** is fixedly provided inside the housing of the scanner below the sensor rack **10**. The guide frame **12** is directly put on the guide rod **14**. The belt clamp **13** is fastened to a belt **15**, which is driven to move the sensor rack **10** back and forth on the guide rod **14** in the scanning path, enabling the sensor **11** to pick up the image of document. Spring members **16** are provided between the sensor **11** and the sensor rack **10**. The spring members **16** can spring leaves or coil springs. The sensor **11** has slides **17** upwardly extended from the top side thereof. A glass **18** is fixedly provided in the housing of the scanner above the sensor **11**. The spring members **16** impart an upward pressure to the sensor **11**, forcing the slides **17** into close contact with the glass **18** to control the focal length of the sensor **11**.

As stated above, the guide frame **12** is provided at the bottom side of the sensor rack **10** and directly put on the guide rod **14**. This installation procedure is simple. After installation of the sensor rack **10**, the two bevel surfaces **121;122** are disposed in contact with the guide rod **14** at a respective contact point. The limited contact area (two contact points) between the bevel surfaces **121;122** of the guide frame **12** and the guide rod **14** causes less friction resistance during movement of the sensor rack **10** on the guide rod **14**.

FIG. 3 shows a scanner according to a second embodiment of the present invention. According to this embodiment, the bevel surfaces **121;122** of the guide frame **12** have a respective raised portion **123** or **124** respectively disposed in contact with the guide rod **14**. Because of point of contact, less friction resistance is produced during movement of the sensor rack **10** on the guide rod **14**.

FIG. 4 shows a scanner according to a third embodiment of the present invention. According to this embodiment, the guide rod **14** is directly injection-molded on the bottom frame **19** of the scanner. During installation, the guide frame **12** is directly put on the guide rod **14** to guide movement of the sensor rack **10** on the guide rod **14**.

Although particular embodiments of the invention have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the invention. Accordingly, the invention is not to be limited except as by the appended claims.